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Can We Monitor Socioeconomic Inequalities In Health? A Survey of U.S. Health Departments' Data Collection and Reporting Practices

SYNOPSIS

Objective. To evaluate the potential for and obstacles to routine monitoring of socioeconomic inequalities in health using U.S. vital statistics and disease registry data, the authors surveyed current data collection and reporting practices for specific socioeconomic variables.

Methods. In 1996 the authors mailed a self-administered survey to all of the 55 health department vital statistics offices reporting data to the National Center for Health Statistics (NCHS) to determine what kinds of socioeconomic data they collected on birth and death certificates and in cancer, AIDS, and tuberculosis (TB) registries and what kinds of socioeconomic data were routinely reported in health department publications.

Results. Health departments routinely obtained data on occupation on death certificates and in most cancer registries. They collected data on educational level for both birth and death certificates. None of the databases collected information on income, and few obtained data on employment status, health insurance carrier, or receipt of public assistance. When socioeconomic data were collected, they were usually not included in published reports (except for mothers educational level in birth certificate data). Obstacles cited to collecting and reporting socioeconomic data included lack of resources and concerns about the confidentiality and accuracy of data. All databases, however, included residential addresses, suggesting records could be geocoded and linked to Census-based socioeconomic data.

Conclusions. U.S. state and Federal vital statistics and disease registries should routinely collect and publish socioeconomic data to improve efforts to monitor trends in and reduce social inequalities in health.

One vital mission of public health is to monitor trends in health, disease, and well-being.¹⁻⁴ Data on population distributions of natality, morbidity, and mortality provide a scientific foundation for public health policy and for efforts to prevent disease and premature mortality and to improve health. Appreciating the importance of these data, in 1842 Massachusetts became the first state to mandate statewide registration of vital statistics.² Other states soon followed suit, and by 1933, the Federal Death and Birth Registration Area—comprised of

states routinely and uniformly collecting vital statistics data—including all U.S. states.^{2,3} Since that time, all U.S. state health departments have routinely collected, tabulated, and reported birth and death rates. They also have supplemented these vital statistics by tracking incidence, prevalence, and survival rates for several specific diseases, including syphilis and several other sexually transmitted diseases, tuberculosis (TB), cancer, and, most recently, HIV/AIDS.^{4,5} These data have provided important descriptions of differences in morbidity and mortality by age, sex, and what is referred to as “race.”^{5,6}

Unlike in Great Britain and several other European countries,⁷ however, published reports of U.S. Federal and state vital statistics typically have not included data relating health status to socioeconomic position and specifically to factors such as occupation, educational level, or income.^{5-6,8-10} In a 1985 survey researchers found, for example, that occupation was recorded on death certificates in only 60% of U.S. states and parents' occupations were recorded on birth certificates in only 27% of states.¹¹

One consequence of the long-standing lack of socioeconomic data in U.S. vital statistics has been to render invisible—in official, routinely gathered statistics—a profound socioeconomic gradient in health, readily apparent in European data and documented in the United States by innumerable studies showing that those with fewer socioeconomic resources are constrained to live shorter, less healthy lives.^{6-10,12-20} Instead, U.S. public health data have been “racialized,” meaning that social inequalities in health are typically presented solely in “racial” or “racial/ethnic” terms. The routine stratification of U.S. public health data by “race,” in the absence of socioeconomic data, however, has perpetuated erroneous but widespread views that “race”—wrongly construed as a strictly biological variable—explains “racial/ethnic” disparities in health.^{6,8,10,21-23} Hidden from view are ways that economic—as well as noneconomic—forms of racial discrimination and inequality drive “racial/ethnic” disparities in health. As a step toward overcoming the persistent and problematic either/or approach to analyzing and interpreting data on social class and “race/ethnicity,” new guidelines issued by the Centers for Disease Control and Promotion²⁴ and increasing numbers of public health researchers^{6,8,10,19-23} are recommending that public health data be stratified by both social class and “race/ethnicity”—neither by itself is sufficient to capture how

class and race relations, separately and together, affect the health of populations.

To address limitations imposed by the paucity of socioeconomic data in U.S. Federal and state vital statistics, the 1989 revision of the U.S. standard certificates added education to the U.S. standard death certificate.²⁵ As of 1992, all 50 states and the District of Columbia included information on mothers' educational level in their annual reporting of birth certificate data.²⁶ Attesting to the importance of these data, both 1992 U.S. national mortality and natality statistics^{26,27} and other analyses based on relatively recent vital statistics data²⁸⁻³¹ provide evidence of marked disparities in outcomes by educational level at both the state and national level; the results also provide insight into how socioeconomic inequalities contribute to “racial/ethnic” and gender inequalities in health. Even so, *Health, United States 1995*,⁵

the annual Federal publication profiling the health of the nation, included socioeconomic data in only 6 (8%) of its 73 tables on Health Status and Determinants (about births, deaths, and morbidity); virtually all of the tables, however, were stratified by “race,” Hispanic origin, and sex. Similarly, county-level 1992 U.S. mortality data, an important resource for local health planning, were also stratified only by age, sex, and “race/ethnicity.” These omissions of socioeconomic data are striking, given the role socioeconomic conditions

The routine stratification of public health data by “race,” in the absence of socioeconomic data, has perpetuated the view that “race”—wrongly construed as a biological variable—explains disparities in health.

play in peoples health.^{6-10,12-17}

Recognizing the importance of routine monitoring of social inequalities in health at the state, local, and tribal levels and further noting that public health departments can collect data above and beyond those specified in the U.S. standard birth and death certificates, the 1994 NIH-sponsored conference on “Measuring Social Inequalities in Health” recommended that public health researchers evaluate the socioeconomic data collected by U.S. public health departments.^{32,33} We accordingly conducted a survey of all state health departments to: (a) determine what types of socioeconomic data they collected and reported on birth and death certificates and in cancer, AIDS, and TB registries and (b) evaluate perceived obstacles to routine collection and publication of socioeconomic data in U.S. state vital statistics.

Methods

The National Center for Health Statistics provided us with a list of contact names, addresses, and telephone and

fax numbers for vital records officers in each U.S. state as well as in New York City, the District of Columbia, Guam, Puerto Rico, and the U.S. Virgin Islands.

To each health department contact person, we sent a cover letter explaining our project, a survey, and a prepaid return envelope. The survey consisted of a self-administered questionnaire that asked about socioeconomic information collected for the mother and father on birth certificates, for the decedent and spouse on death certificates, and in cancer, AIDS, and TB registries. For each type of certificate or registry, we asked if data were collected on: occupation, education, income, employment status, health insurance carrier, and receipt of public assistance. For each type of data collected, the survey further asked who collected the data using what sources of information, what categories or measures were used, and whether the data were coded, tabulated, and included in published reports. We also asked whether residential addresses were recorded, whether they were geocoded, and if so, to what level they were geocoded. In addition, respondents were asked, in open-ended questions, to indicate which socioeconomic data they would like to collect, what barriers existed to collecting these data, and if they had any additional comments to share about collecting and using socioeconomic data in public health databases. To supplement information collected on the survey, we also requested copies of data collection forms and any state-issued publications that reported health trends stratified by socioeconomic variables.

In many cases, vital records personnel forwarded our survey to the appropriate cancer, AIDS, and TB registries in their states and helpfully returned complete data from their states. In some cases, however, we located these registries independently, either through telephone directories or with the help of employees in state agencies.

Follow-up began three weeks after the initial mailing and included three phases. In the first phase, we faxed a reminder to each health department contact person who had not responded. In the second phase, we telephoned state agencies that still had not responded and if necessary, provided them with copies of the survey, either by mail or fax. In the final phase, we interviewed directly, by telephone, health department or registry representatives from the remaining states and transcribed their responses onto blank survey forms in our office.

Most state health departments and other agencies returned the self-administered questionnaire. Personnel at only 4 vital statistics offices, 10 cancer registries, 11 AIDS registries, and 16 TB registries were interviewed by telephone. We had a 100% response rate for vital statistics databases in the 50 U.S. states and a 92% or higher response rate for AIDS, cancer, and TB registries. We also received complete vital statistics information from Guam, Puerto Rico, the U.S. Virgin Islands, the District of Columbia, and New York City.

We used Paradox³⁴ to maintain our tracking database and both Paradox and Epi-Info³⁵ to enter and analyze the survey data. To evaluate the accuracy of the reported data,

we compared the survey responses to the data collection forms sent to us by the states. Where differences were found, we assumed the current data collection form was correct. Mary Anne Freedman, Director of Vital Statistics at the National Center for Health Statistics (NCHS) and George A. Gay, Special Assistant for Registration Methods, NCHS, supplied us with copies of birth and death certificates not sent to us by 22 states and also internal NCHS documents on item comparisons across states for these certificates. We used these to verify our data; where discrepancies occurred, we found our data to be more recent and accurate. One of the authors manually coded responses to qualitative questions concerning perceived barriers and suggested measures and, with another author, identified general categories to represent the kinds of responses received.

We report data separately for the 50 states and the five remaining reporting areas.

Results

Table 1 shows which socioeconomic data were collected and reported by the U.S. state, city, territorial, and commonwealth vital statistics and disease registries that responded to our survey.

Overall we found that—other than occupation on death certificates and in cancer registries and education on birth and death certificates—socioeconomic data were not routinely collected. Moreover, when collected, these data were usually not included in states' vital statistics publications—except for mothers education on birth certificates, which was reported by 66% of states.

None of the vital statistics or disease databases collected information on income, and few obtained data on employment status, health insurance carrier, or receipt of public assistance. All databases, however, included residential addresses, suggesting records could be geocoded and linked to Census-based socioeconomic data; few states, however, employed this methodology.

Occupation. Data on mother's occupation was collected on birth certificates in 25 (50%) of 50 states. Of these 25 states, 14 (56%) asked for mother's occupation during the past year, three asked for usual occupation, two asked for most recent occupation, one asked for occupation one year ago, and five asked for occupation by some other or unspecified criterion. Of the states in which mother's occupation was recorded on birth certificates, only two reported birth data by mother's occupation in their state vital statistics publications; thus, only 4% (2/50) of all states routinely reported such data.

Similarly, 24 (48%) state birth registries obtained data on father's occupation. Of these, 14 recorded father's occupation in the last year, five recorded father's usual occupation, and five recorded father's occupation in some other or unspecified manner. Of the states collecting information on father's occupation, none routinely reported birth data by father's occupation in their state vital statistics publications.

Table 1. States and other reporting areas collecting and reporting occupation, education, and income data in vital statistics and disease registries.

| | Occupation | | | | | | | Education | | | | | | | Income | | | | | | | | | |
|-----------------------|-------------------|--------|-----|-------------------|--------|--------------------|------------------|-------------------|--------|--------|-------------------|---------------|--------|--------------------|-------------------|----------------|--------|-------------------|----|---------------|--------|--------------------|------------------|----------------|
| | Birth certificate | | | Death certificate | | | | Birth certificate | | | Death certificate | | | | Birth certificate | | | Death certificate | | | | | | |
| | Mother | Father | | Dece- dent | Spouse | Cancer registry | AIDS registry | TB registry | Mother | Father | | Dece- dent | Spouse | Cancer registry | AIDS registry | TB registry | Mother | Father | | Dece- dent | Spouse | Cancer registry | AIDS registry | TB registry |
| States | | | | | | | | | | | | | | | | | | | | | | | | |
| Response rate | 100 | 100 | 100 | 100 | 92 | 94 | 96 | 100 | 100 | 100 | 100 | 92 | 94 | 96 | 100 | 100 | 100 | 100 | 92 | 94 | 94 | | | |
| Percent collecting | 50 | 48 | 100 | 0 | 80 | 100 | 100 | 100 | 100 | 94 | 0 | 7 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| Percent reporting | 4 | 0 | 12 | 0 | 9 | 2 | 10 | 66 | 26 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | |
| Alabama | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | |
| Alaska | ○ | ○ | ● | ○ | NA | ● | ● | ● | ● | ● | ○ | ○ | NA | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Arizona | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Arkansas | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | | | | |
| California | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Colorado | ○ | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Connecticut | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Delaware | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Florida | ○ | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Georgia | ● | ○ | ● | ○ | ... | ... | ... | ● | ● | ○ | ○ | ... | ... | ... | ... | ... | ○ | ○ | ○ | ... | | | | |
| Hawaii | ○ | ○ | ● | ○ | ... | ... | ... | ● | ● | ● | ○ | ... | ... | ... | ... | ... | ○ | ○ | ○ | ... | | | | |
| Idaho | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Illinois | ● | ● | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Indiana | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Iowa | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Kansas | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Kentucky | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Louisiana | ○ | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Maine | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Maryland | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Massachusetts | ● | ● | ● | ○ | ● | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Michigan | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Minnesota | ○ | ○ | ● | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Mississippi | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Missouri | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Montana | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Nebraska | ● | ● | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Nevada | ● | ● | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| New Hampshire | ● | ● | ● | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| New Jersey | ● | ● | ● | ○ | ○ | ● | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| New Mexico | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| New York | ● | ● | ● | ○ | ... | ... | ● | ● | ● | ● | ○ | ... | ... | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| North Carolina | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| North Dakota | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Ohio | ● | ● | ● | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Oklahoma | ○ | ○ | ● | ○ | ... | ● | ● | ● | ● | ● | ○ | ... | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Oregon | ○ | ○ | ○ | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Pennsylvania | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Rhode Island | ○ | ○ | ● | ○ | ○ | ● | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| South Carolina | ○ | ○ | ● | ○ | ○ | ○ | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| South Dakota | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Tennessee | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Texas | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Utah | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Vermont | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Virginia | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Washington | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| West Virginia | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Wisconsin | ● | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Wyoming | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Other reporting areas | | | | | | | | | | | | | | | | | | | | | | | | |
| Guam | ○ | ○ | ● | ○ | ... | ○ | ... | ● | ● | ● | ○ | ... | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| Puerto Rico | ● | ● | ● | ○ | ... | ... | ... | ● | ● | ● | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| U.S. Virgin Islands | ● | ○ | ● | ○ | ... | ... | ... | ● | ● | ● | ○ | ... | ○ | ... | ... | ○ | ○ | ○ | ○ | ○ | | | | |
| Washington DC | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |
| New York City | ● | ● | ● | ○ | NA | ○ | ○ | ○ | ○ | ○ | ○ | NA | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | | | | |

● = Data collected

○ = Data not collected

● = Partial data collected

... = No response

NA = Not applicable

Table I (continued).

| | Employment | | | | | | | Health insurance carrier | | | | | | | Receipt of public assistance | | | | | | |
|-----------------------|-------------------|--------|-------------------|--------|-----------------|---------------|-------------|--------------------------|--------|-------------------|--------|-----------------|---------------|-------------|------------------------------|--------|-------------------|--------|-----------------|---------------|-------------|
| | Birth certificate | | Death certificate | | Cancer registry | AIDS registry | TB registry | Birth certificate | | Death certificate | | Cancer registry | AIDS registry | TB registry | Birth certificate | | Death certificate | | Cancer registry | AIDS registry | TB registry |
| | Mother | Father | Decedent | Spouse | | | | Mother | Father | Decedent | Spouse | | | | Mother | Father | Decedent | Spouse | | | |
| States | | | | | | | | | | | | | | | | | | | | | |
| Response rate | 100 | 100 | 100 | 100 | 92 | 94 | 94 | 100 | 100 | 100 | 100 | 92 | 94 | 94 | 100 | 100 | 100 | 100 | 92 | 90 | 96 |
| Percent collecting | 2 | 0 | 0 | 0 | 11 | 4 | 42 | 26 | 0 | 0 | 0 | 11 | 57 | 17 | 12 | 0 | 0 | 0 | 0 | 13 | 6 |
| Percent reporting | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 14 | 0 | 0 | 0 | 2 | 2 | 0 | 4 | 0 | 0 | 0 | 0 | 2 | 0 |
| Alabama | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ● | ○ |
| Alaska | ○ | ○ | ○ | ○ | NA | ○ | ○ | ○ | ○ | ○ | ○ | NA | ○ | ○ | ○ | ○ | ○ | ○ | NA | ○ | ○ |
| Arizona | ○ | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Arkansas | ○ | ○ | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ● |
| California | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Colorado | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Connecticut | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Delaware | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Florida | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Georgia | ○ | ○ | ○ | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ... | ... | ... |
| Hawaii | ○ | ○ | ○ | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ... | ... | ... |
| Idaho | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Illinois | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Indiana | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Iowa | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Kansas | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Kentucky | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Louisiana | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Maine | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Maryland | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Massachusetts | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Michigan | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Minnesota | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Mississippi | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Missouri | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Montana | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Nebraska | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Nevada | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| New Hampshire | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| New Jersey | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| New Mexico | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| New York | ● | ○ | ○ | ○ | ... | ... | ○ | ○ | ○ | ○ | ○ | ... | ... | ○ | ○ | ○ | ○ | ○ | ... | ... | ○ |
| North Carolina | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| North Dakota | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Ohio | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Oklahoma | ○ | ○ | ○ | ○ | ... | ○ | ○ | ○ | ○ | ○ | ○ | ... | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ... | ○ |
| Oregon | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Pennsylvania | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Rhode Island | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| South Carolina | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| South Dakota | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Tennessee | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Texas | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Utah | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Vermont | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Virginia | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Washington | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| West Virginia | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Wisconsin | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Wyoming | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Other reporting areas | | | | | | | | | | | | | | | | | | | | | |
| Guam | ○ | ○ | ○ | ○ | ... | ○ | ... | ○ | ○ | ○ | ○ | ... | ○ | ○ | ○ | ○ | ○ | ○ | ... | ○ | ○ |
| Puerto Rico | ● | ● | ● | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ... | ... | ... |
| U.S. Virgin Islands | ○ | ○ | ○ | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ... | ... | ... | ○ | ○ | ○ | ○ | ... | ... | ... |
| Washington DC | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| New York City | ● | ○ | ○ | ○ | NA | ○ | ○ | ○ | ○ | ○ | ○ | NA | ○ | ○ | ○ | ○ | ○ | ○ | NA | ○ | ○ |

● = Data collected

○ = Data not collected

⊖ = Partial data collected

... = No response

NA = Not applicable

Data on decedent's usual occupation were collected by death registries in all 50 states; however, only six states (12%) routinely reported death data by decedent's occupation. No death registry obtained information on occupation of the decedent's spouse or partner.

Of the 45 state cancer registries responding to the survey, 36 (80%) collected occupational data. Nine of these recorded current occupation, 27 recorded usual occupation, and 10 did not specify what type of occupational data they collected. Of the states in which occupational data were recorded by cancer registries, in only four were these data routinely reported in state publications.

All states are required to use Centers for Disease Control and Prevention (CDC) case reporting forms for AIDS and TB cases. These forms collect minimal occupational information, identifying only occupations considered to be at high risk for HIV or TB infection (for example, health care workers). A more detailed occupational supplement to the CDC TB case report form (which also obtains data on income) has been piloted in several states but has not been widely used (Personal communication, Lisa Gaston, Tuberculosis Surveillance Branch, CDC, 1997).

Three states used their own TB reporting forms, all of which ask for patient's occupation using an open-ended question.

Education. Where recorded, education was measured by year or grade completed.

For reporting purposes, these data were typically collapsed into categories by credential (for example, less than high school, high school graduate, some college, college graduate, postgraduate).

Mother's and father's education, measured as year or grade completed, were included in birth certificates in every geographic area included in the survey. Birth data were reported by mother's education in 33 (66%) of states. Birth data were reported by father's education in 13 (26%) of states.

Education of the decedent, measured as year or grade completed, was recorded in 47 (94%) of state death registries. Of these states, only 7 (15%) published death data by education of decedent.

Only two of 50 cancer registries collected education data; neither routinely reported these data.

Income. Data on income were not recorded in birth, death, cancer, AIDS, or TB registries.

Employment status. Only one state collected data on employment status, and only on its birth certificates, which asked whether the mother was employed during the pregnancy.

Health insurance carrier. The mother's health insurance carrier was noted on birth certificates in 13 states. Data on health insurance carriers were also recorded by 27 AIDS registries, five cancer registries, and eight TB registries. No states collected data on health insurance carriers on death certificates.

Receipt of public assistance. Only a few states collected information on receipt of public assistance: six for the mother on birth certificates, six states in their AIDS registries, and three in their TB registries. Father's receipt of public assistance was not recorded on birth certificate, and data on public assistance were not recorded on death certificates or in cancer registries.

With a few exceptions, socioeconomic data were not routinely collected and, when collected, they were usually not included in states' vital statistics publications.

Geocoding. Although addresses, per se, are not socioeconomic data, geocoding of residential addresses provides a means of appending area-based socioeconomic data to public health databases.^{36,37} Geocoding

refers to the process of identifying an address state, county, tract, and block-group Census codes and postal zip code. With these codes, each individual's record can be linked to Census-based socioeconomic data on her or his residential neighborhood.

A census tract (or "block-numbering area" in rural regions) on average contains 4000 people; a census block-group, a subdivision of a census tract, typically contains 1000 people and is generally more economically homogeneous than a census tract.³⁸ By contrast, zip codes usually include upwards of 30,000 people, typically not homogeneous in their sociodemographic characteristics.³⁹

As shown in Table 2, all states reported obtaining residential addresses on birth certificates (mother's address) and death certificates and in their cancer, AIDS, and TB registries. All states geocoded addresses on birth and death certificates to at least the county and large city level. Geocoding of addresses was less common for the other types of databases: 58% for cancer registries, 32% for AIDS registries, and 16% for TB registries. Among states geocoding their data, all geocoded to the county level, several to the zip code level, several to the tract level, and only a few to the block-group level (Table 3).

Very few states reported publishing health data stratified

Table 2. States and other reporting areas collecting residential address data in vital statistics and disease registries

| | Birth certificate | | Death certificate | | Cancer registry | AIDS registry | TB registry |
|--------------------|-------------------|--------|-------------------|--------|-----------------|---------------|-------------|
| | Mother | Father | Decedent | Spouse | | | |
| States | | | | | | | |
| Response rate | 100 | 98 | 100 | 98 | 92 | 94 | 94 |
| Percent collecting | 100 | 0 | 100 | 0 | 100 | 100 | 100 |
| Alabama | ● | ○ | ● | ○ | ● | ● | ● |
| Alaska | ● | ○ | ● | ○ | NA | ● | ● |
| Arizona | ● | ○ | ● | ○ | ● | ● | ● |
| Arkansas | ● | ○ | ● | ○ | ● | ● | ● |
| California | ● | ○ | ● | ○ | ● | ● | ● |
| Colorado | ● | ○ | ● | ○ | ● | ● | ● |
| Connecticut | ● | ○ | ● | ○ | ● | ● | ● |
| Delaware | ● | ○ | ● | ○ | ● | ● | ● |
| Florida | ● | ○ | ● | ○ | ● | ● | ● |
| Georgia | ● | ○ | ● | ○ | ... | ... | ... |
| Hawaii | ● | ○ | ● | ○ | ... | ... | ... |
| Idaho | ● | ○ | ● | ○ | ● | ● | ● |
| Illinois | ● | ○ | ● | ○ | ● | ● | ● |
| Indiana | ● | ○ | ● | ○ | ● | ● | ● |
| Iowa | ● | ○ | ● | ○ | ● | ● | ● |
| Kansas | ● | ○ | ● | ○ | ● | ● | ● |
| Kentucky | ● | ○ | ● | ○ | ● | ● | ● |
| Louisiana | ● | ○ | ● | ○ | ● | ● | ● |
| Maine | ● | ○ | ● | ○ | ● | ● | ● |
| Maryland | ● | ○ | ● | ○ | ● | ● | ● |
| Massachusetts | ● | ○ | ● | ○ | ● | ● | ● |
| Michigan | ● | ○ | ● | ○ | ● | ● | ● |
| Minnesota | ● | ○ | ● | ○ | ● | ● | ● |
| Mississippi | ● | ○ | ● | ○ | ● | ● | ● |
| Missouri | ● | ○ | ● | ○ | ● | ● | ● |
| Montana | ● | ○ | ● | ○ | ● | ● | ● |
| Nebraska | ● | ○ | ● | ○ | ● | ● | ● |
| Nevada | ● | ○ | ● | ○ | ● | ● | ● |
| New Hampshire | ● | ○ | ● | ○ | ● | ● | ● |
| New Jersey | ● | ○ | ● | ○ | ● | ● | ● |
| New Mexico | ● | ○ | ● | ○ | ● | ● | ● |
| New York | ● | ○ | ● | ○ | ... | ... | ● |
| North Carolina | ● | ○ | ● | ○ | ● | ● | ● |
| North Dakota | ● | ○ | ● | ○ | ● | ● | ● |
| Ohio | ● | ○ | ● | ○ | ● | ● | ● |
| Oklahoma | ● | ○ | ● | ○ | ... | ● | ● |
| Oregon | ● | ○ | ● | ○ | ● | ● | ● |
| Pennsylvania | ● | ○ | ● | ○ | ● | ● | ● |
| Rhode Island | ● | ○ | ● | ○ | ● | ● | ● |
| South Carolina | ● | ○ | ● | ○ | ● | ● | ● |
| South Dakota | ● | ○ | ● | ○ | ● | ● | ● |
| Tennessee | ● | ○ | ● | ○ | ● | ● | ● |
| Texas | ● | ○ | ● | ○ | ● | ● | ● |
| Utah | ● | ○ | ● | ○ | ● | ● | ... |
| Vermont | ● | ○ | ● | ○ | ● | ● | ... |
| Virginia | ● | ○ | ● | ○ | ● | ● | ● |
| Washington | ● | ○ | ● | ○ | ● | ● | ● |
| West Virginia | ● | ○ | ● | ○ | ● | ● | ● |
| Wisconsin | ● | ○ | ● | ○ | ● | ● | ● |
| Wyoming | ● | ○ | ● | ○ | ● | ● | ● |

Other reporting areas

| | | | | | | | |
|---------------------|---|---|---|---|-----|-----|-----|
| Guam | ● | ○ | ● | ○ | ... | ● | ● |
| Puerto Rico | ● | ● | ● | ○ | ... | ... | ... |
| U.S. Virgin Islands | ● | ○ | ● | ○ | ... | ... | ... |
| Washington DC | ● | ○ | ● | ○ | ● | ● | ● |
| New York City | ● | ○ | ● | ○ | NA | ● | ● |

● = Data collected ... = No response
○ = Data not collected NA = not applicable

by Census-derived socioeconomic measures: six in relation to mother's address on the birth certificate, four in relation to decedent's address on the death certificate, and one in relation to address at AIDS diagnosis. None had issued reports using such data from their cancer or TB registries. Eight additional states, however, indicated interest (especially on the part of cancer registries) in learning more about geocoding; of these, five reported that such projects were in progress or might be undertaken in the near future.

Perceived barriers and suggestions. Personnel from 44 health departments responded to open-ended questions about their interest in and perceived barriers to routine collection of socioeconomic data in vital statistics and disease registries. The most commonly identified barriers were lack of resources and concerns about the confidentiality or accuracy of the data (Table 3). As noted by one respondent, "We're short-staffed; we do well to get the required reporting done." Another described "high interest in geocoding and occupation/industry coding but insufficient staff, funds." Still another reported lukewarm support in the agency since "policy makers seem relatively uninterested in the relationship of socioeconomic status and health, despite demonstrated relationship." Interestingly, one respondent stated that "political, industry opposition" was an important obstacle but did not elaborate on the nature of this opposition.

Cancer registries were especially likely to note problems arising from reliance on socioeconomic data recorded in medical charts. Occupation for elderly patients, for example, is often listed simply as retired; moreover, even when usual occupation is listed, these data are often unreliable since a detailed occupational history is generally absent from the medical record. To address limitations in data collected in their AIDS registries, several states also reported participating in the Supplementary HIV/AIDS Surveillance (SHAS) project, funded by the Centers for Disease Control and Prevention.^{40,41} This project collects detailed socioeconomic and sociobehavioral data on a subset of reported HIV and AIDS cases.

Few states offered recommendations for collection of socioeconomic data beyond the types specified in our survey. One respondent suggested collecting data on childhood poverty, salary range, and sources of income, and another suggested including information on "type of health care delivery," for example, public, HMO, or private.

Discussion

Our survey of vital statistics and disease registries in all U.S. states and other NCHS reporting areas reveals that, despite growing sophistication in methods of collecting and analyzing vital statistics data,^{4,42} we in the United States presently have limited capacity to monitor—or to easily access state or local data on—socioeconomic inequalities in health, overall or in relation to "racial"/ethnic and gender inequalities in health. No data are available on income level

Table 3. Number of states geocoding residential address data to the county, zip code, Census tract, and Census block-group levels and number linking Census-derived socioeconomic data to geocoded address

| | <i>Birth mother (birth certificate)</i> | <i>Birth father (birth certificate)</i> | <i>Decedent (death certificate)</i> | <i>Spouse (death certificate)</i> | <i>Cancer registry</i> | <i>AIDS registry</i> | <i>TB registry</i> |
|--|---|---|---|---|----------------------------|--------------------------|------------------------|
| Number of states geocoding to county level | 50 | 0 | 50 | 0 | 29 | 16 | 8 |
| County only | 28 | 0 | 30 | 0 | 1 | 8 | 6 |
| County and zip code | 6 | 0 | 7 | 0 | 3 | 7 | 0 |
| County and tract | 12 | 0 | 10 | 0 | 16 | 1 | 2 |
| County, tract, and block group | 4 | 0 | 3 | 0 | 9 | 1 | 0 |
| Number of states linking Census-derived socioeconomic data to geocoded address | 10 | 0 | 7 | 0 | 10 | 4 | 0 |

NOTE: Geocoding to the zip code level does not necessarily specify county level. Geocoding to the block-group level requires geocoding to the tract level, and geocoding to the tract or block-group level requires geocoding to the county level.

and only limited data are available on employment, health insurance carriers, and receipt of public assistance. Even for education and occupation, the two most widely used measures, reporting is limited: only two-thirds of the states include information on mother's education in published vital statistics reports based on birth certificate data, and at most one-quarter of states publish data on educational level of the father or of the decedent or on occupation of the mother, father, or decedent. Data on occupation, when collected, are collected only for the individual responder (or decedent) and not for his or her spouse or partner, thus precluding understanding of how household social class affects health.³⁶ Moreover, although all states collect residential addresses in their public health databases and geocode their birth and death certificate data to the county and large city level, only 20% link birth certificate data to Census-based socioeconomic measures and only 14% link death certificate data. Additionally, data from fully 50% of the cancer reg-

istries and 96% of the AIDS and TB registries are not geocoded to the census tract or block-group level; nor are birth certificate data in 68% of states or death certificate data in 74% of states. Thus, a useful strategy for using existing data (from public health databases and the Census) to monitor socioeconomic inequalities in health is rarely employed.

Although some states expressed interest in routinely including socioeconomic data in their vital statistics and disease registries, they expressed frustration, in a context of shrinking budgets and increasing demands, at their lack of staff, money and time for data collection, analysis, and dissemination. Compounding this problem of lack of resources was a perception that policy makers, public health researchers, and the public at large lack interest in or understanding of the significance of socioeconomic data for public health databases. Some states also cited political and industry opposition to collecting socioeconomic data, and many expressed concerns about confidentiality, privacy, and validity of the data.

An additional barrier, perhaps as important, is the belief, expressed by several states, that specialized surveys are sufficient for monitoring socioeconomic inequalities in health. Notably, the National Center for Health Statistics has produced several important special reports on socioeconomic gradients in fertility, morbidity, and mortality, based on data from the National Health Interview Survey.⁴³⁻⁴⁸ Yet, as recently emphasized by Pollack and Rice in their evaluation of U.S. capacity to monitor trends in health services,⁴⁹ these kinds of reports, however valuable, provide estimates exclusively at the national level, not for state, tribal, or local areas, the locale for most public health interventions. In addition to lack of sufficient detail at the local level, other problems include limited representation of diverse populations and

Table 4. Perceived barriers to collecting socioeconomic information in public health databases

| <i>Barrier</i> | <i>Number of states citing (N=50)</i> |
|--|---|
| Lack of resources (time, money, staff) | 27 |
| Confidentiality/privacy concerns | 26 |
| Concerns about accuracy of socioeconomic data | 18 |
| Socioeconomic data not collected by reporting sources | 14 |
| Opposition ("political," "industry," popular) | 11 |
| Lack of standardization of data or clear guidelines for collecting data | 10 |

both selection and response bias. Specialized surveys of relatively small racial/ethnic populations such as American Indian tribes or Asian and Pacific Islander subpopulations are infrequent and, if based on national sampling frames, are ill-equipped to provide routinely available data for local public health planning.^{21,50} Similarly, reports based on CDC's Supplementary HIV/AIDS Surveillance (SHAS) project have recognized that generalizing from SHAS to all persons living with HIV/AIDS may be limited by selection bias because factors influencing recruitment into SHAS are likely to be related to access to medical care and case identification by medical practitioners.^{40,41} Thus, despite the obvious utility of specialized surveys for obtaining detailed data on health and socioeconomic position, such surveys cannot substitute for routinely collected data on the entire population.^{8,36,49}

Recommendations for future data collection and analysis.

Evidence of existing and growing economic inequalities in health and in wealth in the U.S. and worldwide^{13-18,26-31,51-62} has led the World Health Organization and the U.S. government to urge support for efforts to supplement vital statistics and other health data with appropriate socioeconomic measures.^{15,32,33,63} Amply attesting to the value of these data is their profound effect in Great Britain and other European countries on shaping both public health policy and knowledge about trends in and determinants of population health.^{7,13-17,63,64} In the United States, recent changes in welfare policies^{42,65,66} and in the financing and provision of health services^{42,49} along with increasing levels of inequalities in both income and wealth⁵⁹⁻⁶² accentuate the need for inclusive public health data that can be used to monitor socioeconomic inequalities in health and to illuminate links between public policy and public health.

Based on our survey results, we accordingly urge, as our first recommendation, that U.S. public health databases be routinely geocoded and linked to Census-based socioeconomic data at the block-group (or, less preferably, tract) level. This approach is currently feasible and relatively inexpensive.^{36,37} By linking individuals' residential addresses to their Census-defined geographic codes and then to Census-based socioeconomic data, health departments can generate population-based morbidity, mortality, and natality data stratified by Census-based measures of socioeconomic position. This is possible because both numerators and denominators can be characterized by the same Census-based socioeconomic variables.^{36,37,67-72} One additional noteworthy feature of this methodology is that it can be applied equally to all people regardless of age and gender, thereby avoiding problems associated with occupation- and education-based measures.^{36,37,73} Geocoding addresses to the block-group level, moreover, helps reduce misclassification—and thus dilution of estimates of effect—by minimizing economic heterogeneity in the residential neighborhood unit; zipcode-defined areas are an option of last resort, given their much larger size and greater socioeconomic heterogeneity.^{37,68,71,73,74} Interested readers are encouraged to

consult the growing public health literature on geocoding and Census-based measures of socioeconomic position^{36,37,67-74} to learn more about technical aspects of this methodology (including construction of appropriate Census-based socioeconomic indicators) and about measurement issues related to etiologic period, ecologic and individualistic fallacy, aggregation bias, and residual confounding.

Our second set of recommendations pertain to research initiatives to address gaps in current knowledge. To facilitate collection and reporting of identical socioeconomic measures across public health databases, we urge development of a core set of questions, analogous to the effort expended to develop the Uniform Hospital Data Discharge Set.⁷⁵ Such an endeavor would entail careful consideration of underlying theoretical constructs and the likely ways in which socioeconomic position affects health across the lifespan. Specific measures of socioeconomic position by level (individual, household, neighborhood) or age group (child, adult) could include social class, income, poverty, material and social deprivation, wealth, and education.³⁶ It would similarly be worthwhile for cancer registries and other databases reliant on medical record data to develop forms for socio-demographic data that health care providers could fill out at time of diagnosis and include in the medical chart. In both cases, ensuring that data are meaningful across racial/ethnic and gender groups is critical—for example, to characterize socioeconomic position accurately, data should be collected on both the respondent (or decedent) and her or his spouse or partner.³⁶ Last, to address concerns about privacy (intrusiveness of questions) and confidentiality (strict requirements not to release or make public any individual-level information), research could be conducted on what kinds of socioeconomic questions people deem to be intrusive, thus violating their privacy, once provisions for confidentiality and need for the data are fully explained. Such studies could thus assess whether registrars' concerns about asking questions regarding socioeconomic position accurately reflect concerns of the members of the public, whose lives are represented in vital statistics data.

In conclusion, according to the Institute of Medicine's influential report on *The Future of Public Health*, one essential responsibility of U.S. public health agencies is to "regularly and systematically collect, assemble, analyze, and make available information on the health of the community, including statistics on health status, community health needs, and epidemiologic and other studies of health problems."¹ Given the importance of socioeconomic conditions in shaping population health and needs for health services,^{6-10,12-18,26-33,43-48,51-58} fulfilling the public health mission requires routine inclusion and reporting of socioeconomic data in U.S. vital statistics and disease registries. Data from national probability samples and specialized surveys, however important, cannot substitute for detailed local data necessary to understand and develop interventions to improve communities health. To paint a full picture, these local data should accordingly be stratified by social class,

"race"/ethnicity, gender, and, where appropriate, age. We accordingly encourage mobilizing scientific and public support for improving the U.S. public health data infrastructure and ensuring that socioeconomic data are considered a vital component of U.S. vital statistics.

The authors thank Cathy Wasserman, Cecilia Zapata, Ann Schwartz, and Meg Wise of The Spirit of 1848 for assistance in conducting this survey; Sally Zierler for helpful comments on the manuscript; and the health department officials who took the time to complete the survey.

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